

DOCKET NO: 268090US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
RAINER DYLLICK-BRENZINGER, ET AL. : EXAMINER: A.L. WOODWARD  
SERIAL NO: 10/529,782 :  
FILED: MARCH 30, 2005 : GROUP ART UNIT: 1796  
FOR: ALKYLDIKETENE-CONTAINING AQUEOUS POLYMER DISPERSIONS,  
THEIR PREPARATION AND THEIR USE

SUPPLEMENTAL APPEAL BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the Final Rejection of the claims dated January 14, 2009.

I. REAL PARTY IN INTEREST

The real party in interest is BASF SE.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and their assignee are not aware of any appeals or interferences which will directly affect or be directly affected by or having a bearing on the Board's decision in this appeal.

### III. STATUS OF THE CLAIMS

Claims 31-67 are pending in this application. Claims 31-60 and 62-67 are under appeal. Claim 61 has been withdrawn from consideration. Claims 1-30 have been canceled.

### IV. STATUS OF AMENDMENTS

An Amendment and Request for Reconsideration was filed on May 11, 2009. This amendment has been entered. See the Advisory Action dated May 27, 2009.

An Amendment is submitted herewith in order to amend Claim 44. Claim 44 has been amended to specify that “the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have a particle size of 10 to 500 nm.” This amendment has already been made to independent Claim 31, and the amendment was entered. Entry of this amendment will obviate the rejection under 35 U.S.C. §112, second paragraph.

### V. SUMMARY OF THE CLAIMED SUBJECT MATTER

As set forth in Claim 31, the present invention relates to an alkyldiketene-containing aqueous polymer dispersion {page 1, line 4}, obtained by aqueous emulsion polymerization {page 2, lines 13-16} of at least one hydrophobic monoethylenically unsaturated monomer {page 2, line 15} in the presence of at least one alkyldiketene {page 2, line 16}, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 10 to 500 nm {page 4, lines 40-41}.

As set forth in Claim 44, the present invention also relates to a process for the preparation of an alkyldiketene-containing aqueous polymer dispersion {page 1, line 4}, comprising aqueous emulsion polymerizing {page 2, lines 13-16} at least one hydrophobic

monoethylenically unsaturated monomer {page 2, line 15} in the presence of at least one alkyldiketene {page 2, line 16}, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have a particle size of 10 to 500 nm {page 4, lines 40-41}.

## VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether Claims 31-37, 44-49, 52 and 52 62-67 are unpatentable under 35 U.S.C. §102(b) or §103(a) as anticipated or obvious over JP 4100994 (JP '994).
2. Whether Claims 39-41, 50, 51, 54 and 55 are unpatentable under 35 U.S.C. §103(a) as obvious over JP '994.

## VII. ARGUMENT

1. Claims 31-37, 44-49, 52 and 52 62-67 are not obvious over JP 4100994 (JP '994).

The present invention relates to an alkyldiketene-containing aqueous polymer dispersion, obtained by aqueous emulsion polymerization of at least one hydrophobic monoethylenically unsaturated monomer in the presence of at least one alkyldiketene, where the hydrophobic monoethylenically unsaturated monomer and the alkyldiketene have an average particle diameter of 10 to 500 nm. Thus, in the claimed invention, the hydrophobic monoethylenically unsaturated monomer is polymerized in the presence of the alkyldiketene. See Claims 31 and 44.

In contrast, JP '994 discloses the reaction of a polyalkylene polyamide, followed by the addition of an alkyldiketene. Afterwards, an emulsion polymerization of unsaturated monomers is carried out in absence of alkyldiketene. The alkyldiketene, treated with the polyalkylene polyamide as discussed above, is added afterwards. See working example 2 at

page 2 and 3 of the English translation. Therefore, JP '994 fails to disclose the present invention, because a hydrophobic monoethylenically unsaturated monomer is not polymerized in the presence of an alkyldiketene, as claimed. Moreover, there is no suggestion in the reference to conduct the polymerization in the claimed manner.

In addition, JP '994 fails to disclose or suggest the particle size of the monomer or the alkyldiketene. There is simply nothing in the reference which indicates or even suggests that the hydrophobic monoethylenically unsaturated monomer and the alkyldiketene have an average particle diameter of 10 to 500 nm. In the Final Rejection, the Examiner states:

Given that the emulsion of the reference is emulsified with the aid of a high pressure apparatus, it is reasonably believed that particle sizes of not more than 500 nm of the organic phase, corresponding to that presently claimed, would be achieved. In this regard, it is noted that it is well known in the art that emulsification with the aid of a mechanical emulsification apparatus engenders small particle sizes of the organic phase. Final Rejection at page 6, numbered paragraph 8.

However, the Examiner has not supported this argument with any factual evidence.

Accordingly, the Examiner has failed to show inherency.

In view of the foregoing, the claimed alkyldiketene-containing aqueous polymer dispersion and process for the preparation of an alkyldiketene-containing aqueous polymer dispersion is neither disclosed or suggested by JP '994. Accordingly, the subject matter of Claims 31-60 and 62-67 are neither anticipated by nor obvious over JP '994. Accordingly, withdrawal of these grounds of rejection is respectfully requested.

2. Claims 39-41, 50, 51, 54 and 55 are not obvious over JP '994.

In the Final Rejection, the Examiner states

The selection of a specific alkylketene dimmer [sic] species would have been obvious to one having ordinary skill in the art from the general disclosure of the reference, absent evidence of unusual or unexpected results.

The reference discloses acrylic monomers meeting the presently claimed hydrophilic monomer. It would have been obvious to one having ordinary skill in the art to employ amounts of said monomer in accordance with the ultimate solubility desired for the resulting polymer. [Final Rejection dated January 14, 2009, at page 6.]

Claim 39 depends from Claim 32 and further specifies that the organic phase comprises a solution which comprises

- stearyldiketene and/or palmyldiketene and
- styrene, n-butyl acrylate, tert-butyl acrylate and/or acrylonitrile.

Appellants note that Claim 39 also specifies specific hydrophobic monomers in combination with specified diketenes. No evidence or argument has been provided to explain why such a combination of components would have been obvious in view of JP '994.

Claim 40 depends from Claim 32 and further specifies that the organic phase further comprises hydrophilic monomers in amounts such that the resulting copolymers have a solubility of not more than 10, g/l in water at 20°C and a pH of 2.

Thus, Claim 40 specifies the presence of hydrophilic monomers such that the copolymers have a specified solubility. No evidence or argument has been provided to explain why such features would have been obvious in view of JP '994.

Claim 41 depends from Claim 40 and further specifies that at least one compound selected from the group consisting of the ethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms, acrylamide, methacrylamide, N-vinylformamide, vinyl ethers, 2-acrylamido-2-methylpropane-sulfonic acid, vinylsulfonic acid, styrenesulfonic acid, sulfopropyl acrylate, sulfopropyl methacrylate, fumaric acid, maleic acid, itaconic acid, maleic anhydride, and mixtures thereof is used as the hydrophilic monomer.

No evidence or argument has been provided to explain why the use of such monomers would have been obvious in view of JP '994.

Claim 50 depends from Claim 45 and further specifies that the organic phase comprises a solution which comprises

- stearyldiketene and/or palmityldiketene and
- styrene, n-butyl acrylate, tert-butyl acrylate and/or acrylonitrile.

Appellants note that Claim 39 also specifies specific hydrophobic monomers in combination with specified diketenes. No evidence or argument has been provided to explain why such a combination of components would have been obvious in view of JP '994.

Claim 51 depends from Claim 35 and further specifies that the organic phase comprises, as the nonpolymerizable hydrophobic compound, a hydrocarbon, an alcohol of 10 to 24 carbon atoms, a hydrophobic polymer having a molar mass  $M_w$  of <10 000, a tetraalkylsilane and/or a mixture thereof.

The Office has provided no evidence or argument as to why the features set forth in Claim 51 would have been obvious in view of JP '994.

Claim 54 depends from Claim 44 and further specifies that the organic phase further comprises hydrophilic monomers in an amount such that the resulting copolymers have a solubility of not more than 10, g/l in water at 20°C and a pH of 2.

The Office has provided no evidence or argument as to why the features set forth in Claim 54 would have been obvious in view of JP '994.

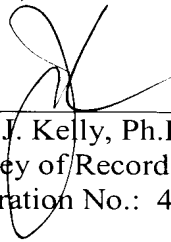
Claim 55 depends from Claim 54 and further specifies that at least one compound selected from the group consisting of the ethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms, acrylamide, methacrylamide, N-vinylformamide, vinyl ethers, 2-acrylamido-2-methylpropanesulfonic acid, vinylsulfonic acid, styrenesulfonic acid, sulfopropyl acrylate, sulfopropyl methacrylate, fumaric acid, maleic acid, itaconic acid, maleic anhydride, and mixtures thereof is used as the hydrophilic monomer.

The Office has provided no evidence or argument as to why selecting the monomers set forth in Claim 55 would have been obvious in view of JP '994.

In view of the foregoing, Reversal of the Examiner's rejections of the appealed claims under is requested.

Respectfully Submitted,

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## CLAIMS APPENDIX

Appealed Claims 31-67 read as follows.

31. An alkyldiketene-containing aqueous polymer dispersion, obtained by aqueous emulsion polymerization of at least one hydrophobic monoethylenically unsaturated monomer in the presence of at least one alkyldiketene, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 10 to 500 nm.

32. The polymer dispersion of Claim 31, obtained by emulsifying an organic phase comprising the at least one alkyldiketene and the at least one monoethylenically unsaturated hydrophobic monomer and polymerizing the monomers.

33. The polymer dispersion of Claim 31, obtained by emulsifying an organic phase comprising the at least one alkyldiketene and the at least one monoethylenically unsaturated hydrophobic monomer in solution, in the presence of a surface-active agent in an aqueous phase with the aid of a mechanical emulsification process, at least one of the organic phase and the aqueous phase additionally comprising a free radical polymerization initiator or a polymerization initiator, and then polymerizing the monomers.

34. The polymer dispersion of Claim 32, wherein the organic phase is emulsified in the aqueous phase by the action of ultrasound or with the aid of a high pressure homogenizer.



35. The polymer dispersion of Claim 32, wherein the organic phase further comprises an additional nonpolymerizable hydrophobic compound.

36. The polymer dispersion of Claim 32, wherein the organic phase further comprises a member selected from the group consisting of vinyl esters of C<sub>12</sub>-C<sub>22</sub>-carboxylic acids, vinyl ethers of C<sub>12</sub>-C<sub>30</sub>-alcohols and C<sub>12</sub>-C<sub>22</sub>-alkyl acrylates.

37. The polymer dispersion of Claim 32, wherein the organic phase comprises a solution, a binary or polynary mixture and/or a dispersion, wherein the solution, a binary or polynary mixture and/or a dispersion comprises

- at least one C<sub>14</sub>- to C<sub>22</sub>-alkyldiketene,
- at least one monomer selected from the group consisting of styrene, methylstyrene, C<sub>2</sub>- to C<sub>28</sub>-olefins, esters of monoethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms and monohydric alcohols of 1 to 22 carbon atoms, vinyl esters of C<sub>1</sub>- to C<sub>18</sub>-carboxylic acids, acrylonitrile and methacrylonitrile, and
- at least one hydrocarbon, an alcohol of 10 to 24 carbon atoms, a hydrophobic polymer having a molar mass Mw of <10 000, a tetraalkylsilane, a vinyl ester of C<sub>12</sub>-C<sub>22</sub>-carboxylic acids, a vinyl ether of C<sub>12</sub>-C<sub>30</sub>-alcohols, a C<sub>12</sub>-C<sub>22</sub>-alkyl acrylate and/or a mixture thereof.

38. The polymer dispersion of Claim 32, wherein the organic phase comprises a solution which comprises

- stearyldiketene, palmityldiketene and/or behenyldiketene,

- styrene, n-butyl acrylate, sec-butyl acrylate, tert-butyl acrylate, 2-ethylhexyl acrylate, methyl methacrylate, n-butyl methacrylate, acrylonitrile, methacrylonitrile and/or vinyl acetate and

- hexadecane, olive oil, polystyrene having a molar mass Mw of from 500 to 5000, siloxanes having a molar mass Mw of from 500 to 5000, cetyl alcohol, stearyl alcohol, palmityl alcohol, behenyl alcohol, vinyl esters of C<sub>12</sub>-C<sub>22</sub>-carboxylic acids, vinyl ethers of C<sub>12</sub>-C<sub>30</sub>-alcohols and/or C<sub>12</sub>-C<sub>22</sub>-alkyl acrylates.

39. The polymer dispersion of Claim 32, wherein the organic phase comprises a solution which comprises

- stearyldiketene and/or palmityldiketene and
- styrene, n-butyl acrylate, tert-butyl acrylate and/or acrylonitrile.

40. The polymer dispersion of Claim 32, wherein the organic phase further comprises hydrophilic monomers in amounts such that the resulting copolymers have a solubility of not more than 10, g/l in water at 20°C and a pH of 2.

41. The polymer dispersion of Claim 40, wherein at least one compound selected from the group consisting of the ethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms, acrylamide, methacrylamide, N-vinylformamide, vinyl ethers, 2-acrylamido-2-methylpropane-sulfonic acid, vinylsulfonic acid, styrenesulfonic acid, sulfopropyl acrylate, sulfopropyl methacrylate, fumaric acid, maleic acid, itaconic acid, maleic anhydride, and mixtures thereof is used as the hydrophilic monomer.

42. The polymer dispersion of Claim 31, obtained by polymerization in the presence of at least one water-soluble and/or water-swellaable polysaccharide.

43. The polymer dispersion of Claim 42, obtained by mixing the emulsion with an aqueous solution which comprises at least one water-soluble and/or water-swellaable polysaccharide, and polymerizing the monomers of the emulsion in the presence of the water-soluble and/or water-swellaable polysaccharide.

44. A process for the preparation of an alkyldiketene-containing aqueous polymer dispersion, comprising aqueous emulsion polymerizing at least one hydrophobic monoethylenically unsaturated monomer in the presence of at least one alkyldiketene, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have a particle size of 10 to 500 nm.

45. The process of Claim 44, comprising emulsifying an organic phase comprising the at least one alkyldiketene and the at least one monoethylenically unsaturated hydrophobic monomers and polymerizing the monomers.

46. (Previously Presented): The process of Claim 45, wherein the organic phase comprises

- at least one alkyldiketene and
- at least one monoethylenically unsaturated hydrophobic monomer

and is emulsified in the presence of a surface-active agent in an aqueous phase with the aid of a mechanical emulsification process, at least one of the organic phase and the aqueous phase

additionally comprising a free radical polymerization initiator or a polymerization initiator, and then,

the monomers are polymerized.

47. The process of Claim 45, wherein the organic phase further comprises at least one additional nonpolymerizable hydrophobic compound.

48. The process of Claim 45, wherein the organic phase further comprises a member selected from vinyl esters of C<sub>12</sub>–C<sub>22</sub>-carboxylic acids, vinyl ethers of C<sub>12</sub>–C<sub>30</sub>-alcohols and C<sub>12</sub>–C<sub>22</sub>-alkyl acrylates.

49. The process of Claim 45, wherein the organic phase comprises a solution, a binary or polynary mixture and/or a dispersion, wherein the solution, a binary or polynary mixture and/or a dispersion comprises

- at least one C<sub>14</sub>– to C<sub>22</sub>-alkyldiketene and
- at least one monomer selected from the group consisting of styrene, methylstyrene, C<sub>2</sub>– to C<sub>28</sub>-olefins, esters of monoethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms and monohydric alcohols of 1 to 22 carbon atoms, vinyl esters of C<sub>1</sub>– to C<sub>22</sub>-carboxylic acids, acrylonitrile and methacrylonitrile.

50. The process of Claim 45, wherein the organic phase comprises a solution which comprises

- stearyldiketene and/or palmityldiketene and
- styrene, n-butyl acrylate, tert-butyl acrylate and/or acrylonitrile.

51. The process of Claim 35, wherein the organic phase comprises, as the nonpolymerizable hydrophobic compound, a hydrocarbon, an alcohol of 10 to 24 carbon atoms, a hydrophobic polymer having a molar mass  $M_w$  of  $<10\,000$ , a tetraalkylsilane and/or a mixture thereof.

52. The process of Claim 44, wherein the aqueous phase comprises a surface-active anionic compound.

53. The process of Claim 44, wherein the aqueous phase comprises, as a surface-active agent, sodium laurylsulfate, sodium dodecylsulfate, sodium hexadecylsulfate, sodium dioctylsulfosuccinate and/or at least one adduct of from 15 to 50 mol of ethylene oxide with 1 mol of a  $C_{12}$ – to  $C_{22}$ -alcohol.

54. The process of Claim 44, wherein the organic phase further comprises hydrophilic monomers in an amount such that the resulting copolymers have a solubility of not more than 10, g/l in water at 20°C and a pH of 2.

55. The process of Claim 54, wherein at least one compound selected from the group consisting of the ethylenically unsaturated carboxylic acids of 3 to 5 carbon atoms, acrylamide, methacrylamide, N-vinylformamide, vinyl ethers, 2-acrylamido-2-methylpropanesulfonic acid, vinylsulfonic acid, styrenesulfonic acid, sulfopropyl acrylate, sulfopropyl methacrylate, fumaric acid, maleic acid, itaconic acid, maleic anhydride, and mixtures thereof is used as the hydrophilic monomer.

56. The process of Claim 44, wherein the polymerization is carried out in the presence of at least one water-soluble and/or water-swellaable polysaccharide.

57. The process of Claim 56, wherein the emulsion is mixed with an aqueous solution which comprises an aqueous starch and the mixture is polymerized in the presence of at least one polymerization initiator.

58. The process of Claim 57, wherein the emulsion is mixed with an aqueous solution which comprises a degraded starch in solution.

59. The process of Claim 57, wherein the emulsion is mixed continuously or batchwise with the aqueous solution of a water-soluble polysaccharide and polymerized.

60. The process of Claim 57, wherein the water-soluble polysaccharide used is a degraded starch.

61. A method for applying a composition on a surface, comprising:  
applying the aqueous polymer dispersion of Claim 32 on an article,  
wherein the article is paper, leather, natural fibers, natural textiles, manmade fibers, manmade textiles, or a mixture thereof.

62. The polymer dispersion of Claim 31, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 500 nm.

63. The polymer dispersion of Claim 31, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 200 nm.

64. The polymer dispersion of Claim 31, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 100 nm.

65. The process of Claim 44, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 500 nm.

66. (Previously Presented): The process of Claim 44, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 200 nm.

67. The process of Claim 44, wherein the at least one hydrophobic monoethylenically unsaturated monomer and the at least one alkyldiketene have an average particle diameter of 50 to 100 nm.

## EVIDENCE APPENDIX

None.



RELATED PROCEEDINGS APPENDIX

None.